

Redescription of the holotype of *Japonica lutea onoi* Murayama, 1953 and its taxonomic status (Lepidoptera, Lycaenidae)

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Abstract A redescription of the holotype male of *Japonica lutea onoi* Murayama, 1953 is given not only for the external features but for the genitalia. The genitalia of the holotype are completely identical with those of the taxon from northern Japan which is exclusively associated with *Quercus dentata*, characterized by brownish spots encircling the 2nd to 6th abdominal spiracles in the later instar larvae, and recently separated from *lutea* as a good species with a restored name *onoi* based on external features (Inomata, 1990). Therefore, the current identification of *onoi* is completely verified. *J. onoi* is a species distinctly separable from related species, *lutea*, *adusta* and *patungkoanui* based on the morphology of the male genitalia.

Key words Lycaenidae, *Japonica lutea onoi*, holotype, redescription, genitalia.

Introduction

Japonica lutea onoi Murayama, 1953 was first described by one of us, Murayama, as a Hokkaido subspecies of *Japonica lutea* (Hewitson, [1865]) based on the male holotype, the female allotype and 9 male and 4 female paratypes from Obihiro, Hokkaido, Japan. This subspecies had been ignored or treated as a synonym of subspecies *lutea* in the subsequent comprehensive works of the Japanese butterflies (Shirôzu, 1959; Fujioka, 1975; Kawazôé & Wakabayashi, 1976; Fukuda *et al.*, 1984; Inomata *et al.*, 1986), mainly because the distinguishing characters of *onoi* (smaller size and darker ground colour) were thought not to be distinctive, and the individuals similar to it are also found in other areas of Japan (Shirôzu, 1959; Fujioka, 1975). Inomata *et al.* (1986) recognized the distinctive differences between the Hokkaido and the Honshu populations, but even in their work this taxonomic problem remains to be solved in future studies.

Recently it was elucidated that there occur two distinct species group taxa of the *lutea* group in Hokkaido and northern Honshu. One taxon is identical with *J. lutea lutea* widely distributed in Japan. The other taxon is extremely similar to *lutea* in the external features of adults, but it is quite distinct from *lutea* in the following respects: the final (4th) instar larvae are marked with brownish spots surrounding the 2nd to 6th abdominal spiracles; the adults are exclusively inhabitants of the forest of *Quercus dentata*, on which the females lay eggs; the eggs are usually laid in a cluster, often arranged in a row; the ground colour of wings has a weaker orange tinge than in *lutea* (Aoyama *et al.*, 1991, Kudo & Hatanaka, 1991, Yokokura & Takeda, 1991). Inomata (1990) identified this second taxon associated with *Q. dentata* as *Japonica onoi* based on the external features of the adults, treating it as a species distinct from *lutea*. The adults of the two taxa are said to be externally distinguishable by a combination of several features of the wing markings, colouration and shape, but any one of these characters is not independently reliable. On

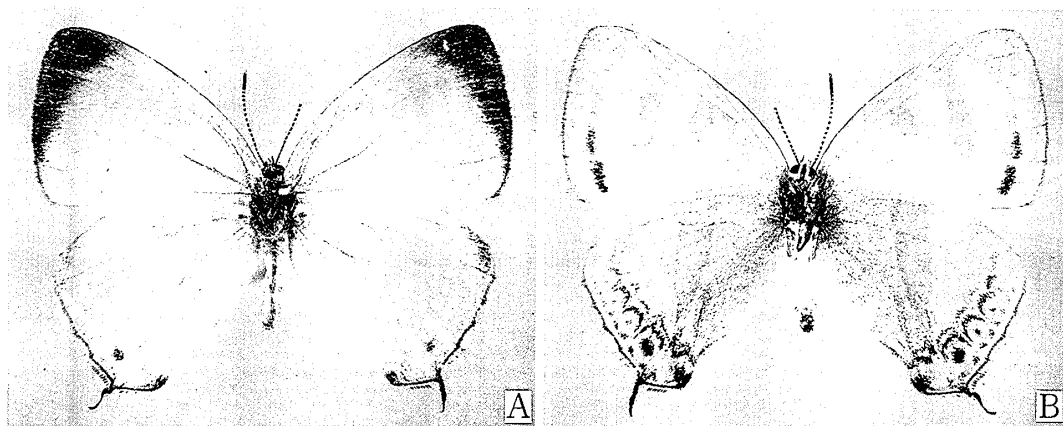


Fig. 1. The holotype of *Japonica lutea onoi* Murayama, 1953. A: Upperside. B: Underside.

the other hand, more reliable characters to distinguish the two are found in the male genitalia (Fujioka, 1992; Inomata, 1992; Aoyama, 1993a; Saigusa, 1993a, 1993b). Therefore, the study of the genitalia of the holotype male of *onoi* is indispensable to stabilize the nomenclature of the *lutea* group. In this paper we give a description and illustrations of the male genitalia of the holotype in addition to a redescription of external features, verify the current identification of *onoi*, and comment on its taxonomic status.

Japonica (Yuhbae) onoi Murayama, 1953

Japonica lutea onoi Murayama, 1953. *Butterflies Moths* 3: 18, 20, figs 7-8. Type locality: Obihiro, Hokkaido, Japan.

Japonica onoi: Inomata, 1990. *Key to the Japanese Butterflies in natural Colour*: 66, figs 433-435.

Japonica lutea onoi: Mikami, 1991. *Chôken-Field* 6(4): 3-5., figs 1-8 (colour photographs of type specimens including the holotype).

Japonica (Yuhbae) onoi: Saigusa, 1993a. *Zephyrus Researches* (1): 2.

Japonica adusta onoi: Fujioka, 1993. *Butterflies* (5): 31 (part.).

Japonica lutea: Shirôzu, 1959. In Inoue et al., *Iconographia Insectorum Japonicorum Colore natulali edita* 1: 32; Fujioka, 1975, *Butterflies of Japan* [1]: 96, 290; Inomata, et al. 1985, *Atlas of the Japanese Butterflies*: 117 (part. nec Hewitson, [1865]).

Holotype. Male bearing the following three labels. 北海道帯広 [=Hokkaido, Obihiro]/25-7-1952/SMURAYAMA. *lutea/onoi/HOLOTYPE*. *HOLOTYPE/Japonica lutea onoi/Murayama, 1953/labelled by Murayama/& Saigusa, 1994*.

Description. The holotype was reset after taking the photographs in Mikami (1991), so that the habitus is somewhat different from these photographs. Head and thorax dark yellowish brown above, abdomen greyish yellow, same colour as middle of space 1a of hindwing, slightly darkened on middorsal line. Frons 0.38 times as wide as head; antenna 0.38 times as long as forewing, compound eye much sparsely clothed with fine hairs 2/3 as long as 2nd flagellomere. Wing shape: Forewing termen only slightly arched outwards; hind wing termen almost straight from apex to base of tail. Wing markings. Upperside: Yellowish orange in ground colour, and slightly paled basally and along forewing costa, hindwing clearer, more vivid yellowish orange. Forewing with blackish brown border almost as wide as 1/5 length of forewing near costa, evenly tapered posteriorly to tip of vein 2, and continuing to blackish outer marginal line of space 1b+c; fringe greyish brown,

tinged with yellow posteriorly. Hindwing with weak dark suffusion by blackish scales at apex in space 7, outer margin with an extremely thin dark brown line, which is somewhat broader posteriorly; tornus blackish with a few bluish white scales anteriorly; space 1b+c with a tiny black-bordered whitish area distally near tornal spot; space 2 with a submarginal black spot small, with its diameter $1/3$ as long as width of space 2 at the level of the spot; fringe grey, basally yellowish white; tail 0.2 times as long as hindwing, black, white fringed at apex.

Underside: Dull pale yellowish brown in ground colour, slightly darker in hindwing, tinged with orange on anterodistal part of space 1b+c proximal to submarginal black bar in forewing. Forewing with discocellular and postdiscal bands yellowish brown, darker than the ground colour, bordered basally and apically with thin dull white lines with a slight yellowish tinge; discocellular band 1.5 times as long as wide; postdiscal band slightly narrower than discocellular band, almost straight, and parallel to outer margin of wing; distance between discocellular and postdiscal bands (width of ground coloured area between them) slightly longer than $1/10$ length of forewing; blackish brown inner submarginal bars in spaces 1b+c and 2, slightly convex outwards, submarginal white line thin and indistinct, much obscured anteriorly in anterior $1/2$ of wing; submarginal orange band rather broad in space 1b+c, narrowed to $1/3$ - $1/2$ width between wing margin and submarginal black bar in space 2, much narrowed and obscured in space 3, almost disappearing anterior to vein 4; fringe yellowish brown. Hindwing with a broad dark yellowish brown median band nearly 1.6 times as wide as postdiscal band of forewing at costa, gently tapered posteriorly; fine whitish lines bordering the median band dull white with a slight yellowish tinge, without silvery lustre, but more distinct and whitish than those of forewing; whitish bar bordering inner submarginal blackish lunules concolorous with the whitish lines bordering median band, but more distinctly tinged with yellow anteriorly; the white bar thinly black bordered proximally in spaces 1b+c to 3; submarginal black lunules [-shaped or Σ -shaped in spaces 1b+c and 2, C-shaped in spaces 3 to 5; median submarginal black spots rather weakly developed, that in space 2 $4/9$ as wide as the space at the level of spot, slightly lower than wide, those of spaces 3 to 5 much reduced in size, represented by a few black scales; twin outer submarginal spots also small; submarginal orange area broad (excluding area distad of twin spots), in space 2 longitudinal length (width of the band) of orange area as long as width of the space; a much narrow yellowish grey line along the black outer margin; tornal black spot slightly larger than median submarginal spot in space 2; fringe yellowish grey, mixed with black ones posteriorly; tail as on upperside.

The genitalia are much similar to those of *lutea* but distinctly differing in a few features. In the following lines the description is given for most of genitalic characters. Dorsum 0.31 times as long as height of ring, obliquely raised posterodorsally, with its posterior margin broadly truncate and straight, 0.38 times as long as width of ring; dorsum sparsely short setose from apex of socius to posterior $1/3$ of its dorsal surface; socius slender; a membranous incision between socius and lateral process of tegumen not extending to the middle level between tip of socius and apex of dorsum in lateral aspect; falx 1.4 times as long as dorsal margin of dorsum, rather thick, evenly curved and gradually tapered to apex; lateral process of tegumen weak; vinculum gradually and evenly tapered ventrally; saccus 0.58 times as long as height of ring measured from anterodorsal corner of ring to base of saccus.

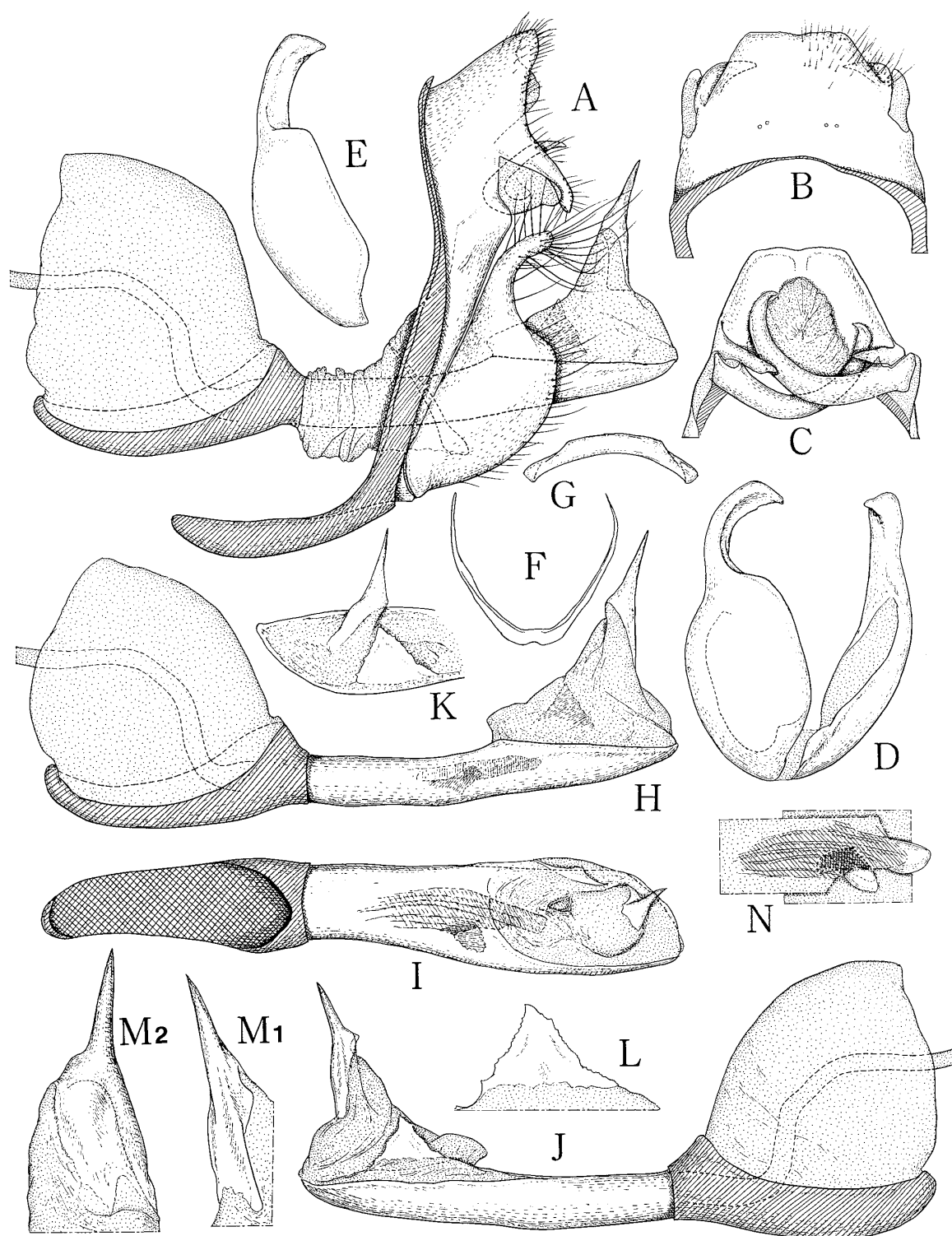


Fig. 2. The male genitalia of the holotype of *Japonica lutea onoi* Murayama, 1953. A: Whole genitalia, lateral aspect. B: Dorsum, dorsal aspect. C: *Ditto*, ventral aspect. D: Valvae left posterolateral aspect. E: Left valva, posteroventral aspect. F: Juxta, posterior aspect. G: *Ditto*, ventral aspect. H: Phallus, left lateral aspect. I: *Ditto*, dorsal aspect. J: *Ditto*, right lateral aspect. K: Apex of aedeagus in dried condition. L: Proximal carina penis, lateral aspect. M₁: Distal carina penis, lateral aspect. M₂: *Ditto*, posterior aspect. N: Cornuti, dorsal aspect. Magnification of L, M₁ and M₂ is different from that of other figures.

Valva nearly 0.7 times as long as height of ring, broad on basal $2/3$, most expanded posteriorly near the middle, strongly tapered apically near its $2/3$, apical slender portion long, in posteroventral aspect $1/3$ as long as the broad basal portion. Juxta much slender, U-shaped.

Phallus only slightly longer than 1.5 times height of ring, nearly straight; suprazonal portion of aedeagus slightly shorter than 1.4 times length of subzonal portion, flattened, 2 times as wide as thick at the middle, and gradually widened distally to the middle, there 1.4 times as wide as at zone or 0.16 times as wide as length of phallus, then keeping the same width to its subapical portion; perivesical area slightly longer than $1/2$ length of suprazonal portion, much expanded dorsally when inflated, the distance between sclerotized margin of aedeagus to the highest portion of membranous area slightly shorter than 0.4 times suprazonal length; the perivesical area bearing two detached carinae penis, the basal carina situated at apical 0.7 (proximal portion 0.6, distal portion 0.8) of suprazonal sheath, lamellate and isosceles triangle in shape, slightly higher than $1/2$ length of bottom, with finely serrate margin, separated from right lateral margin of aedeagal wall by membranous area 0.05 times as wide as suprazonal length; the apical carina situated at tip of suprazonal sheath, separated from tip of aedeagal wall by membranous area 0.2 times as long as suprazonal sheath, the apical carina of a narrow sclerite, 0.37 times as long as suprazonal sheath, ventrally elongate, and produced into an apical needle-like free process slightly shorter than basal portion; vesica with a dorsal and a ventral cornuti, the former much longer and slightly wider than the latter.

Lengths. Forewing 20.0 mm; body 12.5 mm.

Discussion

Current usage of the name *onoi* Murayama

The name *onoi* Murayama, 1953 was first proposed for the *Japonica* population in Hokkaido, which was originally considered to be a subspecies of *lutea*. In the original description the subspecies was characterized by the smaller size of wings, the reduced or vanishing submarginal spot in the space 2 of hindwing upperside, the underside of wings paler in ground colour and with the white lines narrow and weaker in lustre, and the orange submarginal band of hindwing underside narrow and including smaller black spots (Murayama, 1953). Until recently the taxon *onoi* had been ignored or treated as a synonym of the nominotypical subspecies *lutea* as stated in the introduction of this paper.

During these several years it has been elucidated that there are two taxa of the *lutea* group of the genus *Japonica* in Hokkaido and in the northernmost areas of Honshu. One of the two is apparently identical with *J. lutea* widely spread throughout Japan based on every characters of all the stages. While the other taxon is peculiar in having the following respects in comparison with those of *lutea* (Aoyama *et al.*, 1991; Aoyama, 1993a, b; Aoyama & Kamigaki, 1993; Fujioka, 1993; Inomata, 1990, 1991, 1992; Kudo, 1990, 1991; Kudo & Hatanaka, 1991; Mikami, 1991; Saigusa, 1993b, c, e; Yokokura & Takeda, 1991).

1) Host preference. The adults of this taxon live in the forests of *Quercus dentata*. In Ishikari beach of western Hokkaido, the eggs of this taxon are found mostly in pure stand of *Quercus dentata*, and they are rarely collected on this tree growing in forests mixed with *Q. mongolica grosseserrata*. In northern Honshu, this taxon lives not only in pure stand,

but in mixed forests of *Q. dentata*, *Q. serrata* and *Q. mongolica* var. *grosseserrata*. Nevertheless, it is essential for the habitat of this taxon to include *Q. dentata*. (The adults of *lutea* live in the forests of various species or various combinations of species of the genus *Quercus* including *serrata*, *acutissima*, *aliena*, *variabilis*, *mongolica* var. *grosseserrata*, *dentata* of the subgenus *Quercus* (= *Lepidobalanus*) and even evergreen *Q. glauca* belonging to the subgenus *Cyclobalanopsis*.)

2) Plant for oviposition. The females lay their eggs on twigs of only *Q. dentata*. No egg of this taxon is collected on any other species of *Quercus*. (In *lutea* the eggs are laid on twigs of any species of *Quercus* mentioned above.)

3) Oviposition habit. The females tend to lay several eggs in a cluster (in Hokkaido mostly 5-12 eggs, in northern Honshu 2-7 eggs in a cluster). The singly laid eggs are rare (in Hokkaido) or not much (1/3 of cases in northern Honshu). (In *lutea* the females usually lay eggs singly.)

4) Host plant of larvae. The known host plant of larvae in the field is only *Quercus dentata*. But we may rear the 1st instar larvae to the adults with any of *Q. variabilis*, *mongolica* var. *grosseserrata*, *serrata*, *acutissima*, *aliena* (Saigusa, unpublished, only for *aliena*) in captivity. (In *lutea* the larvae feed on any species of *Quercus* mentioned above in the field.)

5) Season of adults and larval and pupal periods. The adults of this taxon appear 7 to 10 days ahead of the appearance of *lutea*. Considering the facts that the sprouting of *Q. dentata* is later than those of *serrata* and *mongolica* var. *grosseserrata* in addition to the earlier appearance of the adults, the combined period of larval and pupal stages of this taxon can be assumed to be shorter than that of *lutea*.

6) Chorion. The apical depression of the chorion is larger and deeper than in *lutea*.

7) Markings of larvae. In later instars each of the 2nd to 6th abdominal spiracles is almost always surrounded by a small brownish circular spot. These markings appear most prominently in the last (4th) instar. (In *lutea* any larval instar lacks in the brownish spots encircling the spiracles.)

8) Colouration of pupa. The pupa is pale yellowish green in ground colour, much more tinged with yellow than in *lutea*. (In *lutea* the pupa is pale bluish green.)

9) Male genitalia. a) The basal carina penis on the perivesical area of the aedeagus is situated more distally, and usually higher than basally wide with more sharply pointed apex. (In *lutea* the carina is located more proximally and lower, and with less sharply pointed apex.) b) The apical carina penis is situated more distally, widely separated from lateral margin of sclerotized wall of aedeagus; the carina is smaller and elongate, and its apical portion is sharply pointed into a needle-like process. (In *lutea* the apical carina is situated more proximally, close to lateral margin of aedeagus; the carina is broad basally and its apical portion produces into a short spine-like process, or the carina as a whole representing a wide triangle evenly tapered into a pointed top.) c) In ventral aspect the suprazonal portion of aedeagus is rather slender. (In *lutea* the aedeagus is wider.)

10) Female genitalia. a) The cervix bursae is more elongate than in *lutea*. b) The signum of the corpus bursae is slenderer than in *lutea*.

11) Wing markings. a) The ground colour is less tinged with orange than in *lutea*, and

this tendency is more prominent on upperside. b) The submarginal black spot in the space 2 on the upperside of hindwing tends to be reduced, often completely disappears. (In *lutea* the black spot is usually well marked, but sometimes reduced and rarely obsolete.) c) The white fine lines (bordering the discocellular bar, the postdiscal band or the median band and the submarginal area) on the underside of wings are narrower and have weaker lustre than in *lutea* and often tinged with yellow. d) The submarginal orange areas on the underside of forewing are rather narrower, well marked in the spaces 1 and 2, and recognizable in the space 3, but they become much paler and indistinguishable from the ground colour anterior to the vein 3. (In *lutea* the orange band is broad, and usually well marked even anterior to the vein 3.) e) The postdiscal band on the underside of forewing tends to shift inwardly, and it is sometimes much close to or connected with the discocellular band. (In *lutea*, the postdiscal band runs much distant from the discocellular band.) f) The white and the black lunules bordering proximally the submarginal orange area on the underside of hindwing are more strongly angulate along the veins, so that the markings are [-shaped or Σ -shaped. (In *lutea* the lunules are rather evenly curved, so that they are C-shaped.)

12) Wing shape. The outer margin of the forewing is straighter, the apex of the wing is more strongly produced than in *lutea*. The outer margin of the hindwing also tends to be straighter.

13) Size of the adults. The length of forewing of the taxon in Hokkaido is 20-21 mm. (That of *lutea* in Hokkaido is 16-18 mm.)

14) Sympatry with *lutea*. In Hokkaido *Q. dentata* often grows in a pure stand, so that the sympatry of the two species in habitats is not recorded. While in Takizawa-mura in Iwate Pref. of Honshu, *Q. serrata*, *mongolica* var. *grosseserrata* and *dentata* grow mixed with each other, there the eggs of this taxon were found on *dentata* and those of *lutea* on the other *Quercus*, therefore the both taxa seem to be sympatric with each other in this locality.

As stated in the introduction of this paper, the taxon associated with *Q. dentata* was first identified by Inomata (1990) as *Japonica onoi* Murayama, 1953. He did not mention the basis of his identification, but his treatment is probably based on the pale colouration of the underside ground of the wings mentioned in the original description of *onoi*, as in a key he gave differences between the two species, *onoi* and *lutea* as follows: "Ground colour of underside with a strong reddish tinge, and final instar larva without dark markings on sides*lutea* ; ground colour of underside being pale yellowish brown tone, final instar larva with dark markings at sides.....*onoi*." (translated from Japanese.) He also mentioned as follows: "There are constant differences in the colouration and markings of the adults between the *Japonica lutea* group taxon which lives in forests of *Q. mongolica* var. *grosseserrata* in Hokkaido and the other taxon living exclusively in forests of *Q. dentata* [in the same island]. They differ [from each other] in the markings of the larvae, and some ecological differences are also found. Moreover, differences are found in the male genitalia. I assigned the taxon [occurring in the *Q. dentata* forest] to *onoi* Murayama (stat. n.) which was described as a subspecies [of *lutea*]." (translated from Japanese.)

Inomata (1991) again stated the identification of the taxon, and reaffirmed his identification based on the colour photographs of the holotype male of *onoi* given by Mikami (1991). Thus the identification of the taxon became to have more stable ground, and currently most authors followed him in this respect.

We studied the genitalia of 10 male specimens which were bred from the eggs laid in

masses on twigs of *Q. dentata* in captivity by the females collected at the *Q. dentata* forest of Ishikari-chô in Hokkaido and identified as *onoï* based on external features. These males are quite identical with the taxon associated with *Q. dentata* mentioned above in the morphology of chorion, the larval markings, the pupal colouration and the wing shape and markings. We compared the male genitalia of the holotype of *onoï* with those of the above-mentioned 10 males and with the genitalia illustrations of *onoï* given by Inomata (1992). The result of the comparison is that the character states of every structure of the male genitalia of the holotype of *onoï* are identical with those of the Ishikari specimens or agree with the Inomata's illustrations. Thus the current usage of the species group name *Japonica onoï* Murayama, 1953 to the taxon associated with *Q. dentata* in Hokkaido and northern parts of Honshu is completely verified, as the most independently reliable differences in the dried adult males between the two taxa are now detected only in the shape of the apical carina penis and positions of the two carinae penis of the aedeagus.

Taxonomic status of *Japonica lutea onoï* Murayama, 1953

Inomata (1990) not only used *onoï* for the taxon associated with *Q. dentata*, but first treated this taxon distinct from *Japonica lutea* (Hewitson, [1865]) in the species level. Although at present we do not have any experimental result on the interspecific hybridization between them, the independency of *onoï* from *lutea* is well supported by the above-mentioned differences between them which range from the egg to the adult, and from morphology to ecology including their sympatric distributions. Inomata's treatment was already fully criticized and varified by Saigusa (1993c, e). On the other hand, Saigusa (unpublished) studied the male genitalia of a syntype (? holotype) male of *Japonica lutea* (Hewitson, [1865]) through the courtesy of Mr P. Ackery of the Natural History Museum, London, and clarified the syntype is identical with the taxon currently treated as *lutea* in Japan or in this paper.

Recently Fujioka (1993) treated *onoï* Murayama, 1953 as a subspecies of *Japonica adusta* (Riley, 1939)¹ originally described from western China. The similarity of shape and position of the apical carina penis of the male aedeagus is only the morphological basis of this synonymy at the species level stated by him. This treatment based on morphology has no sound basis even from the view point of morphospecies concept, as the ranges of individual variations of shape and position of the apical carina penis are not sharply separated between *lutea* and *adusta* (s. str.) exclusive of *onoï*, as the overlappings of the same features between *adusta* and *onoï* were not clearly shown, and as he did not explain indisputable ground of his disregard of the differences of shape and position of the basal carina penis between *adusta* and *onoï* as a character of morphospecies concept, and indisputable ground of his reliance solely on the shape and position of apical carina penis as the morphological character to distinguish morphospecies. At present we do not have any important information on the morphology of immature stages, the oviposition habit, and the larval host plants of *adusta*. These data of Japanese taxa of this genus were already fully tested to be essential for the biological species concept in the *lutea* group by the excellent contributions made by Japanese field workers as stated above. At present the most reasonable and logical taxonomic treatment of *lutea*, *adusta*, *onoï* and *patungkoanui* is that proposed by Aoyama (1993b) except the controversial exclusion of *mizobei*

¹ The male genitalia of the holotype of *Japonica lutea adusta* (Riley, 1939) have been examined by Saigusa (unpublished).

from *onoi*, i.e. these four species group taxa, *lutea*, *adusta*, *onoi* and *patungkoanui*, each represents a distinct morphological species, and each of *lutea* and *onoi* is a good biological species distinct from each other. Thus, at present, we treat *Japonica lutea onoi* Murayama, 1953 as a distinct species, *Japonica onoi* Murayama, 1953, not as a subspecies of either *Japonica lutea* (Hewitson, [1865]) or *Japonica adusta* (Riley, 1939).

Acknowledgements

We are grateful to Mr H. Kitahara of the Forestry and Forest Products Researches Institute for providing the eggs of *Japonica onoi*, from which we got the adults used for the comparison of the male genitalia with the holotype of this species. One of us, Saigusa, expresses his cordial thanks to Prof. Emeritus T. Shirôzu for his kind suggestion on the Theclini taxonomy.

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摘 要

Japonica lutea onoi Murayama, 1953 の完模式標本の再記載及びその分類学的位置 (鱗翅目, シジミチョウ科) (三枝豊平・村山修一)

アカシジミの北海道産の亜種として記載された *Japonica lutea onoi* Murayama, 1953 の完模式標本について♂交尾器の形態を含む分類形質の再記載を行い, 本分類単位が現在, カシワアカシジミまたはキタアカシジミの和名を持つ分類群と同一であること, すなわち現行の同定が正しいこと, 及び本分類単位の *Japonica* 属内での分類学的位置について論じた。

1) *Japonica lutea onoi* Murayama, 1953 の完模式標本の♂交尾器は, 全般的な構造としては, アカシジミ *J. lutea* のそれに極めて類似するが, phallus の periveiscal area にある 2 個の carinae penis の内, a) 基部にあるものが, suprazonal portion の長さの約 0.7 の位置 (その中央よりはるかに端にずれた位置) にあり, この形状が正三角形に近く, 頂点が鋭く尖ること; b) 先方にあるものが, aedeagus の骨化部の縁から suprazonal portion 長の 0.2 に相当する距離にわたって膜質部によって分離されており, その形状は細長く, 先端の遊離突起は針状であり, 基部の非遊離部の長さよりやや短い, という 2 点で明確に異なる。なお, valva の先端の細長い部分も長く, 基部の幅広い部分の長さの約半分である点も, アカシジミの一般的な形状とは異なる。斑紋については, 原記載で主要な形質はほとんど記述されているが, 現在の *Japonica* 属の種の形質評価に応じた記載を示した。

2) 前項で明らかにされた本種の完模式標本の♂交尾器及び外観の諸特徴は, 数年前より北海道及び東北地方の北部で, カシワアカシジミまたはキタアカシジミの和名で呼ばれ, カシワと密接な生態的関連性を有するアカシジミの分類単位の形態的諸特徴と完全に一致する。この分類単位は, すでに猪又 (1991) によって, その成虫の外観に基づいて, 種群名 *onoi* を適用され, アカシジミとは独立の種 *Japonica onoi* として扱われていた。しかし, ♂交尾器に見られる前述の諸構造に, 種の相違が明確に現れるために, 完模式標本のこれらの構造の研究が, 学名の安定的使用にとって不可欠であった。本研究の結果, 彼によるこの学名のカシワアカシジミに対する適用が妥当であることが明らかになった。すなわち, カシワアカシジミ (キタアカシジミ) の学名の種群名として, *onoi* が有効名であることが確定した。なお, *onoi* が種 *lutea* には含まれない独立の分類単位であることは, 成虫の形態学的形質のほかに, 卵殻の形態, 幼虫の斑紋, 蛹の色彩, 発生期, 生長速度, 産卵習性, 産卵植物選択性, 成虫の生息環境などの諸点の相違から, ほとんど確証されており, 本論文でもこの見解に従った。

3) 藤岡 (1993) は, *onoi* を, Riley (1939) によって中国西部から *lutea* の亜種として記載され, 青山 (1993a) によって独立種とされた *Japonica adusta* の亜種にした。その根拠は, 先方にある carina penis が aedeagus の“先端近くにあって先端が長くのび, 形状が細い”形質状態で, *onoi* と *adusta* が一致するという点であり, 一方, これが, “側方にあって山型で”基方の carina penis と“キチン化部が連続し

ている”形質状態のものをアカシジミ *lutea* とした。しかし、このような形態種の分類を妥当化するためには、a) 先方の *carina penis* の位置と形状が *onoi* を含めない狭義の *adusta* と *lutea* で明確に区別できること、b) 同じ特徴が、*adusta* と *onoi* で変異幅を著しく共有すること、c) 同じ *carina penis* でありながら、先端の *carina penis* は形態種の識別形質として用いるが、基方の *carina penis* の各集団間の相違を形態種の識別特徴として無視してもよいという根拠、の3点が明確に示される必要がある。これらが明確に示されていない現在、筆者等の判断によれば、アカシジミ亜属 *Yuhbae* の種分類の現時点でのもっとも妥当な体系は、青山 (1993b) によって提示されたもの（議論の分かれる *mizobei* と *onoi* の種レベルでの分割を除く）であり、アカシジミ亜属 *Yuhbae* には、生物学の諸側面から検証されつつある生物学的種概念に近い種 *J. lutea* と *J. onoi*、及び形態種としての *J. adusta* 及び *J. patungkoanui* の4種が含まれることになる。

(Accepted November 13, 1993)